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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/651,272

08/28/2003

Timothy R. Fox

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8397

24628

7590

07/27/2004

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EXAMINER

YUN, JURIE

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 07/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/651,272

Applicant(s)

FOX ET AL.

Examiner

Jurie Yun

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/8/03.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 5, 8-10, 13, 16, 18, 19, 22, 25, and 28-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Clinthorne et al. (US 2003/0223532 A1).

3. With respect to claims 1, 8, 18, and 29, Clinthorne et al. disclose a method of extending a dynamic range of an X-ray imaging system, such method comprising the steps of: detecting first and second substantially identical samples of each of a plurality of X-ray beams; amplifying each first sample of the substantially identical samples using a first gain value; amplifying each second sample of the substantially identical samples using a second gain value; and forming an X-ray image from the detected X-ray beams amplified by the first gain value and from the detected X-ray beams amplified by the second gain value (page 3, paragraphs [0042]+). Clinthorne et al. also disclose providing an X-ray to optical converter (page 3, paragraph [0044]).

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4. With respect to claim 28, Clinthorne et al. disclose a method of extending a dynamic range of an X-ray imaging system, such method comprising the steps of: detecting first and second substantially identical samples of a non-coincident portion (see Fig. 3, the high and low exposure pixels, for example, 1" and 1', are adjacent to each other) of an X-ray beam within each of a plurality of regularly spaced detector areas; amplifying each of the plurality of detected portions using a first gain value for the first samples of the substantially identical samples and using a second gain value for the second samples of the substantially identical samples; and forming an X-ray image from the amplified portions at the first gain value and from the amplified portions at the second gain value (page 3, paragraphs [0042]+).

5. With respect to claims 2, 9, 10, and 19, Clinthorne et al. disclose the step of detecting the plurality of X-ray beams further comprises providing a scintillating element for converting each of the plurality of X-ray beams into visible or near-visible light (page 3, paragraph [0044]).

6. With respect to claims 5, 16, and 25, Clinthorne et al. disclose forming a single X-ray image from the detected X-ray beams amplified by the first gain value and from the detected X-ray beams amplified by the second gain value (Abstract).

7. With respect to claims 13 and 22, Clinthorne et al. disclose the scintillating element comprises plastic (page 5, paragraph [0084]).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 3, 14, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clinthorne et al. (US 2003/0223532 A1) as applied to claims 1, 2, 8, 9, 18, and 19 above, and further in view of Oppelt et al. (USPN 6,005,908).

10. With respect to claims 3, 14, and 23, Clinthorne et al. are silent as to the type of sensors employed as pixels. Oppelt et al. disclose common CT detectors having a photodiode disposed on a scintillating element (see Fig. 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use photodiodes as the Clinthorne et al. pixels because of their small size and high sensitivity.

11. Claims 4, 6, 7, 15, 17, 24, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clinthorne et al. (US 2003/0223532 A1) as applied to claims 1, 5, 8, 18, and 25 above.

12. With respect to claims 4, 15, and 24, Clinthorne et al. are silent as to forming a first X-ray image from the detected X-ray beams amplified by the first gain value and a second X-ray image from the detected X-ray beams amplified by the second gain value. However, it would have been obvious to one of

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ordinary skill in the art at the time the invention was made to do this in order to be able to make the information and the differences visually observable.

13. With respect to claims 6, 17, and 26, Clinthorne et al. are silent as to displaying pixels from the detected X-ray beams amplified by the first gain value with a first color value and pixels from the detected X-ray beams amplified by the second gain value using a second color value. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to do this to make the information and the differences more clearly observable.

14. With respect to claims 7 and 27, Clinthorne et al. are silent as to displaying pixels from the detected X-ray beams amplified by the first and second gain values normalized to a single gray-scale pixel range. However, Clinthorne et al. disclose this in the prior art (page 1, paragraph [0013]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to display pixels from the detected X-ray beams amplified by the first and second gain values normalized to a single gray-scale pixel range in the Clinthorne et al. apparatus in order to better visualize the differences.

15. Claims 11, 12, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clinthorne et al. (US 2003/0223532 A1) as applied to claims 8 and 18 above, and further in view of Nakamura et al. (USPN 5,831,269).

16. With respect to claims 11, 12, 20, and 21, Clinthorne et al. do not disclose the scintillating element comprises a single crystal or a polycrystalline material, or a ceramic material. Nakamura et al. disclose a scintillating element comprising a single crystal and a ceramic material (column 2, lines 15+). It would have been

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obvious to one of ordinary skill in the art at the time the invention was made to have the scintillating element in the Clinthorne et al. apparatus comprise a single crystal and a ceramic material, because, as taught by Nakamura et al. (column 2, lines 15+), this would show a high luminescence efficiency and a high conversion efficiency of X-ray energy.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Toshiaki (USPN 4,700,233) discloses image sensors having alternating arrays of high and low sensitivity picture elements. Seppi et al. (USPN 6,486,808 B1) disclose a data signal amplifier with automatically controllable dynamic signal range. Kump et al. (USPN 6,175,658 B1) disclose spatially-selective edge enhancement for discrete pixel images. Annis et al. (USPN 6,278,115 B1) disclose a plastic scintillator.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 571 272-2497. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jurie Yun
July 20, 2004



Craig E. Church
Primary Examiner